

Maeyama Yasukatsu, *Astronomy in Orient and Occident*. Hildesheim, New York: G. Olms, 2003, x, 562 pp.

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This is a collection of 25 papers by Professor Maeyama Yasukatsu 前山保勝 published between 1974 and 2000 who is a Professor Emeritus for history of astronomy at the Institute for History of Science in J. W. Goethe University in Frankfurt, Germany. He was born in Sapporo, Japan, in 1931, and studied at Tohoku University and J. W. Goethe University under the supervision of Willy Hartner.

The papers in this book deal with various topics of historical astronomy spanning the East and the West. They are precious pieces of work in the field of history of astronomy that are almost beyond compare. Many of them, however, might seem almost impossible for ordinary historians to understand since they often present mathematical formulae and figures, and adopt statistical techniques to draw key conclusions. The level of mathematics and statistics used in the papers are actually not very high for people in the field, but their proper understanding does require some experience in scientific research and a good knowledge of celestial mechanics.

I personally find Professor Maeyama's works greatly impressive because he introduced scientific techniques to the field of history of science so early, and applied them to a wide range of topics covering the East to the West in space and from Babylonia to the Renaissance in time. In particular, I was surprised to read that he used the minimum variance method to determine the epoch of constellation maps some twenty years before I applied it to measure the epoch of the Korean planisphere, *Cheon-Sang-Yoel-Cha-Bun-Ya-Ji-Do* 天象列次分野之圖.

He presents various formulae for the motions of solar system objects derived from celestial mechanics often in great detail. In many of the papers the text is full of mathematical formulae derived by him explaining the motions of celestial bodies. These formulae are extremely helpful

to those who want to understand the approximate scientific models of the past.

Nevertheless, these formulae occupy too much space in the book and are presented in too much detail, often disturbing the flow of ideas in the text. The author should have presented almost all derivations in the appendices, since the readers do not need to know how all those formulae have been obtained. Only the final formulae, those needed to address the issues at hand, should appear in the main text. Since celestial mechanics problems can be easily solved with extreme precision by computers these days, one can now rely on computer packages to conduct similar historical studies. (Of course, a deeper understanding of the historical development of theories can be better obtained through analytic formulae like those in this book.) A further difficulty of this book is that most of the papers in this book do not have abstracts. This makes it difficult for the reader to grasp the issues and main conclusions of each paper, despite the author repeatedly presenting, throughout the book, his views about how astronomical theories have developed.

I briefly review the chapters of this book below.

Chapter I: Far East

This chapter consists of five papers on historical Chinese astronomy. Topics covered include the oldest Chinese star catalogue, development of the 28 lunar mansions, the equatorial coordinate system and the pole star, and the four cardinal points of the compass.

Chapter II: Antiquity

The first two papers in this chapter are about Babylonian knowledge of the motion of the Moon. These are extensive works on Babylonian lunar theory, which require knowledge of the motions of both the Moon and the Sun. The third paper compares the ancient stellar observations by Timocharis, Aristyllus, Hipparchus, and Ptolemy. The author applies statistical techniques to estimate the accuracy of stellar positions and to find the epoch of observation.

Chapter III: Renaissance

The papers in this chapter mainly deal with the understanding of the motion of the Sun or the orbital motion of the Earth from the time of the ancient Greeks to the Renaissance. A large part of these papers is devoted to analytic formulae for solar theory.

Chapter IV: Motion of celestial objects

In this chapter Maeyama presents nine papers containing numerous, highly detailed mathematical formulae for the motion of celestial objects. The formulae include analytic expressions for the synodic periods of planetary motions, the motion of planets around a certain reference point, and the length of seasons. They can be useful in estimating the accuracy of traditional models, and finding the major improvements in the historical theories. Therefore, this part of the book is the kind of source material that can be used for historical purposes.

Chapter V: General history of astronomy

I was able to read only one out of the two papers in this chapter. Here the author inspects the development of astronomy in different places on the Earth and in different periods of human history to show some fundamental similarities and dissimilarities. For this purpose he reviews qualitatively the history of the knowledge of parallax, precession, and motions of the celestial bodies.